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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,909	08/26/2003	Satyanarayana Dharanipragada	YOR920030259US1	5755

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EXAMINER	
LENNOX, NATALIE	
ART UNIT	**PAPER NUMBER**
2609	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/26/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/649,909	DHARANIPRAGADA ET AL.
	Examiner	Art Unit
	Natalie Lennox	2609

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 26 August 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-27 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-27 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 08/26/2003 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 08/26/2003.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 11-15 and 24-27 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

With respect to claims 11-15 and 24-27, applicant claims a "computer program product" embodied in a "tangible media". There is no description or definition in applicant's disclosure of the computer program product or its tangible media. More specifically, claims 11 and 24, claim "computer readable program codes" coupled to the "tangible media". This subject matter is not limited to that which falls within a statutory category of invention because it is not limited to a process, machine, manufacture or a composition of matter. This is a practical application in the technical arts, however the computer program product and computer readable program codes as claimed are simply functional descriptive material, and thus a computer program *per se.*

Claim Rejections - 35 USC § 103

1. Claims 1, 6, 11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US Patent 6,567,776) in view of Chandrasekar et al. (US Patent 6,578,032).

As per claims 1 and 11, Chang et al. teach a method and computer program product comprising:

receiving a first model based on a first set of training data, the first set of training data originating from a first set of common entities (cluster model 202, Col. 2, lines 35-41, also Fig. 2 shows the two speaker cluster models 202 and 204, each of the speaker cluster model having substantially similar characteristics); and

receiving a second model based on a second set of training data, the second set of training data originating from a second set of common entities (cluster model 204, Col. 2, lines 35-41, also Fig. 2 shows the two speaker cluster models 202 and 204, each of the speaker cluster model having substantially similar characteristics); but Chang et al. doesn't specifically disclose:

determining the difference in model information between the first model and the second model; and

creating an independent model based on the first set of training data and the second set of training data if the difference in model information is insignificant.

However Chandrasekar et al. teach a cluster A and a cluster C for which a difference between clusters has been determined to be insignificant. As a result cluster A is merged with cluster C forming a newly merged cluster (Col. 10, lines 59-61 and 65-66). It would have been obvious to one having ordinary skill in the art to have used the features of determining a difference between models and creating an independent model as taught by Chandrasekar et al. for Chang et al.'s method and computer program product because Chandrasekar et al.'s

invention automatically analyzes a text string and either updates an existing cluster or creates a new cluster (Col. 2, lines 2-4).

As per claims 6 and 16, Chang et al. teach a system for generating recognition models comprising:

a first model based on a first set of training data, the first set of training data originating from a first set of common entities (cluster model 202, Col. 2, lines 35-41, also Fig. 2 shows the two speaker cluster models 202 and 204, each of the speaker cluster model having substantially similar characteristics); and

a second model based on a second set of training data, the second set of training data originating from a second set of common entities (cluster model 204, Col. 2, lines 35-41, also Fig. 2 shows the two speaker cluster models 202 and 204, each of the speaker cluster model having substantially similar characteristics); but Chang et al. doesn't specifically disclose:

a processing module configured to create an independent model based on the first set of training data and the second set of training data if the difference in model information between first model and the second model is insignificant. However Chandrasekar et al. teach a cluster A and a cluster C for which a difference between clusters has been determined to be insignificant. As a result cluster A is merged with cluster C forming a newly merged cluster (Col. 10, lines 59-61 and 65-66). It would have been obvious to one having ordinary skill in the art to have used the features of determining a difference between models and creating an independent model as taught by Chandrasekar et al. for Chang et al.'s system for generating recognition models because Chandrasekar et al.'s

invention automatically analyzes a text string and either updates an existing cluster or creates a new cluster (Col. 2, lines 2-4).

2. Claims 2, 7, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US Patent 6,567,776) in view of Chandrasekar et al. (US Patent 6,578,032) as applied to claims 1, 6, 11, and 16 above, and further in view of Kanevsky et al. (US Patent 6,529,902).

As per claims 2, 7, and 12, Chang et al. as modified by Chandrasekar et al. teach the method, system, and computer program product according to claims 1, 6, and 11, but don't specifically disclose whether the model information is insignificant is based on a threshold model quantity. Kanevsky et al. teaches *the Kullback-Leibler distance between any two topics is at least h, where h is some sufficiently large threshold* (Col. 5, lines 9-11). Further, Kanevsky et al. teaches *using Kullback-Leibler distance, one can check which pairs of topics are sufficiently separated from each other. Topics that are close in this metric could be combined together* (Col. 12, lines 44-47). It would have been obvious to one having ordinary skill in the art to have used the feature of a threshold model quantity as taught by Kanevsky et al. for Chang et al.'s method, system, and computer program product as modified by Chandrasekar et al. because Kanevsky et al. provides an improved language modeling for off-line automatic speech decoding and machine translation (Col. 2, lines 50-52).

As per claims 3, 8, and 13, Chang et al. as modified by Chandrasekar et al. teach the method, system, and computer program product according to claims

1, 6, and 11, but don't specifically disclose that determining the difference in model information includes calculating a Kullback Leibler distance between the first model and the second model. Kanevsky et al. teaches that *for two different sets, one can define a Kullback-Leibler distance using the frequencies of the sets.* [With the distance] *one can check which pairs of topics are sufficiently separated from each other. Topics that are close in this metric could be combined together* (Col. 12, lines 42-47).

As per claims 4, 9, and 14, Chang et al. as modified by Chandrasekar et al. and in further view of Kanevsky et al. teach the method, system, and computer program product according to claims 3, 8, and 13, wherein whether the model information is insignificant is based on a threshold Kullback Leibler distance quantity (Kanevsky's Col. 5, lines 9-11, *the Kullback-Leibler distance between any two topics is at least h, where h is some sufficiently large threshold,* also they teach (Col. 12, lines 44-47) that *while using the Kullback-Leibler distance, one can check which pairs of topics are sufficiently separated from each other, and that topics that are close in this metric could be combined together*).

3. Claims 5, 10, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al. (US Patent 6,567,776) in view of Chandrasekar et al. (US Patent 6,578,032) as applied to claims 1, 6, and 11 above, and further in view of Wark (US 2003/0231775).

As per claims 5, 10, and 15, Chang et al. as modified by Chandrasekar et al. teach the method, system, and computer program product of claims 1, 6, and 11, but they don't disclose the first, second, and independent models are Gaussian mixture models. Wark teaches multiple class models defined as Gaussian mixture models (paragraph [0135], *the Gaussian mixture model* λ_c *with c=1, 2, ..., C, where C is the number of class models*). It would have been obvious to one having ordinary skill in the art to have defined the models as Gaussian mixture models as taught by Wark for Chang et al.'s method, system, and computer program product as modified by Chandrasekar et al. because Wark's invention relates generally to audio signal processing and, in particular, to the classifivation of semantic events in audio streams (paragraph [0001]).

4. Claims 17, 21, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wark (US 2003/0231775) in view of Verma et al. (US 2002/0174086).

As per claims 17, 21, and 24, Wark teaches a method, system, and computer program product for recognizing data from a data stream originating from one of a plurality of data classes, comprising:

receiving a current feature vector (paragraph [0139], *the segment being classified comprising T clips, and hence being characterized by T clip feature vectors* f_t); and

computing a current vector probability that the current feature vector belongs to one of the plurality of data classes (Paragraph [0139] describes equation (30) which calculates *the model score between the clip feature vectors* f_t

of the segment and one of the C object models (C is the number of class models as defined in paragraph [0135]). The model score is the summing of the log of the probability of feature vector f_i belonging to class λ_c.), but Wark doesn't specifically disclose:

computing an accumulated confidence level that the data stream belongs to one of the plurality of data classes based on the current vector probability and on previous vector probabilities;

weighing class models based on the accumulated confidence; and

recognizing the current feature vector based on the weighted class models.

However, Verma et al. teaches an accumulated confidence level that the data stream belongs to one of the plurality of data classes based on the current vector probability and on previous vector probabilities (paragraph [0020], *cumulative mean H_i of the sample confidence L_{ij} over a large number of samples is used to measure the overall discrimination capability of the classifier,* also paragraphs [0018] and [0019] describe the sample confidence L_{ij} as the *log-likelihood of the k_{th} most likely class such that the l_{ijk}s form order statistics, that is $l_{ij1}>l_{ij2}>\ldots>l_{ijn}$*) ; weighing class models based on the accumulated confidence (paragraph [0024], *a weight w_{ij} is assigned to each classifier as a function of the overall confidence H_i and the sample confidence L_{ij}*); and recognizing the current feature vector based on the weighted class models (paragraph [0024], *once weights w_{ij} for each classifier are known, each incoming sample can be classified in a class by calculating the combined log-likelihood for each class*). It would have been

obvious to one having ordinary skill in the art to have used the feature of a cumulative confidence level as taught by Verma et al. for Wark's method, system, and computer program product because Verma et al. provides method, system, and computer program product that improves the classification accuracy of particular decision fusion applications such as medical imaging, biometric verification, signature or fingerprint verification, robot vision, speech recognition, image retrieval, expert systems, etc (paragraph [0002]).

As per claims 18, 22, and 25, Wark as modified by Verma et al. teach the method, system, and computer program product according to claims 17, 21 and 24 above, wherein computing the current vector probability includes estimating an a posteriori class probability for the current feature vector. (Wark's equation (30) clearly makes use of $p(f_i/\lambda_c)$ or the probability that feature vector f_i belongs to class λ_c. This conditional probability is equivalent to an a posteriori probability because it is the probability of the feature vector given that it belongs to a certain class).

As per claims 19, 23, and 26, Wark as modified by Verma et al. teach the method, system, and computer program product according to claims 17, 21 and 24 above, wherein computing the accumulated confidence level further comprising weighing the current vector probability more than the previous vector probabilities (Verma's paragraph [0022] describe the overall confidence H_i as being a cumulative mean of the L-statistic L_{ij}, also paragraphs [0018] and [0019] describe the L-statistic or sample confidence L_{ij} as the *log-likelihood of the* k_{th} *most likely class such that the* l_{ijk}*s form order statistics, that is* $l_{ij1}>l_{ij2}>\ldots>l_{ijn}$. *The*

order statistic used is simply the difference between the log-likelihoods of the two most likely classes k. That is, $a_1=1$, $a_2=-1$, and all other $a_i s=0$ for $L_{ij}=a_1 l_{ij} + a_2 l_{ij2} + \ldots + a_n l_{ijn}$.).

5. Claims 20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wark (US 2003/0231775) as modified by Verma et al. (US 2002/0174086) as applied to claims 17 and 24 above, and further in view of Catchpole (US 2005/0251390).

As per claims 20 and 27, Wark as modified by Verma et al. teach the method and computer program product according to claims 17 and 24 above, but they don't specifically disclose the method and computer program product further comprising determining if another feature vector is available for analysis. However Catchpole teaches a lexical tree processor that attempts to read the next feature vector from the feature vector buffer and if its not available an error occurs, if the vector is available the tree processor reads the feature vector from the buffer (paragraph [0044], first lines). It would have been obvious to one having ordinary skill in the art to have used the feature of determining if another feature vector is available for analysis as taught by Catchpole for Wark's method and system as modified by Verma et al. because Catchpole provides a circuit that performs parallel processing of speech parameters (paragraph [0004]).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Natalie Lennox whose telephone number is

(571) 270-1649. The examiner can normally be reached on Monday to Friday 7:30 am - 5:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Xiao Wu can be reached on (571) 272-7761. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NL 03/16/2007

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SUPERVISORY PATENT EXAMINER